

A1  
minimum vascular injury, but it requires the highest penetration force and has other related traumatic effects plus risks of internal puncturing resulting from the high penetration force just before the instant when the front resistance ceases; i.e. a dreaded "plunge effect". Between the maximum dilation of the portal and the dilation resulting from a four cutting edge trocar of maximum edge width, there exist the two extremes, (more than four full width cutting edges are rare). These are the two extremes of portal opening. The requirements of good sealing and high dilation are opposite to the ease of penetration since dilation and ease of penetration are opposites. There is no clear way to objectively and quantitatively ascertain the best trocar tip design for a desired entry performance.

---

Page 16, please amend the paragraph at lines 21-29 as follows.

---

A2  
A quick review of the provided example locking system from the user viewpoint reveals that the operations include "arming" the trocar by pushing down on the button at the top of the handle at position 7' shown in FIG. 12, until it "snaps" down; then pushing the trocar against the skin and watching or listening to the position of the button as it slides towards 7" and then "snaps" to its initial position 7'. That will be the indication of having completed the penetration. If, for any reason, button 7 were pushed down accidentally, it could be reset to the "safe" condition by merely moving it in the direction to 7" and then releasing it. It should then get snap-locked at a high level in position 7', and could not be moved without first pushing it down.

---

IN THE CLAIMS

/  
Please add new claims 34-50.

---

A3  
34. (Amended) A surgical device, comprising:  
a handle configured to be gripped;  
a penetrator having a main axis and being attached to said handle;

a substantially planar cutting blade located at a distal end of said penetrator;

a tissue expander expanded at a distal end of the penetrator for expanding a tissue cut by said cutting blade;

an insufflation passageway configured to discharge a pressurized fluid while said cutting blade is inside a body tissue and to transport said pressurized fluid to the body tissue when said cutting blade substantially penetrates the body tissue; and

a substantially planar guard movable with respect to said tissue expander and configured to selectively expose said cutting blade;

wherein said guard has an apex such that an angle subscribed in the apex of the guard is smaller than an angle subscribed by said blade for progressively covering said blade during deployment of the penetrator.

35. (Amended) The surgical device according to claim 34, wherein said insufflation passageway is configured to be pressurized during an insertion of said cutting blade into the body tissue.

36. (Amended) A surgical device, comprising:

a handle configured to be gripped;

a penetrator having a main axis and being attached to said handle;

a substantially planar cutting blade located at a distal end of said cylinder penetrator;

and

an insufflation passageway for discharging a pressurized fluid while said cutting blade is inside a body tissue and for transporting said pressurized fluid across said body tissue when said cutting blade substantially penetrates said body tissue;

an external reservoir for supplying said insufflation passageway with said pressurized fluid;

3  
a check valve positioned between said insufflation passageway and an exterior of the device, said check valve being configured to prevent leakage from said insufflation passageway, wherein said check valve comprises a flap valve openable by said penetrator upon insertion of said penetrator into said handle; and

a substantially planar guard moveable with respect to said cutting blade wherein said guard has an apex such that an angle subscribed in the apex of the guard is smaller than an angle subscribed by said blade for progressively covering said blade during deployment of the penetrator.

37. (Amended) A surgical device, comprising:

a handle configured to be gripped;

a penetrator having a main axis and being attached to said handle;

a substantially planar cutting blade located at a distal end of said penetrator;

a tissue expander located at a distal end of said penetrator for expanding a tissue cut by said at least one cutting blade for insertion of said penetrator; and

a substantially planar guard movable with respect to said tissue expander and configured to expose said cutting blade while said cutting tip is beginning to cut a tissue layer and while said at least one cutting blade is in said tissue layer, and for progressively covering the end of said at least one cutting blade immediately after a most distal point of said cutting blade has substantially passed through said tissue layer;

wherein said cutting blade comprises a single blade having at least one blade edge, said single blade being configured to intersect a distal portion of said penetrator and to intersect substantially along said main axis;

wherein said guard comprises a safety guard substantially parallel to said single blade and wherein said safety guard has an edge configured to intersect a plane containing said

main axis at a safety guard edge angle smaller than a blade edge angle defined by the intersection of said blade edge with said plane.

38. (New) A surgical device, comprising:

a handle configured to be gripped;

a penetrator having a main axis and being attached to said handle;

a substantially planar cutting blade located at a distal end of said cylinder penetrator;

a tissue expander located at a distal end of said penetrator and configured to expand a tissue cut by said cutting tip for insertion of said penetrator; and

a substantially planar guard movable with respect to said tissue expander and configured to expose said cutting tip while said cutting tip is beginning to cut a tissue layer and while said cutting tip is in said tissue layer, and to progressively cover the end of said cutting tip immediately after a most distal point of said cutting tip has substantially passed through said tissue layer; and

a penetration monitor configured to indicate a position of said guard relative to said cutting tip.

39. (Amended) A surgical device, comprising:

a handle configured to be gripped;

a penetrator having a main axis and attached to said handle;

at least one cutting blade located at a distal end of said penetrator;

a tissue expander configured to expand a tissue cut by said at least one cutting blade for insertion of said penetrator; and

a single, substantially planar guard movable with respect to said tissue expander and being configured to selectively expose said at least one cutting blade wherein said guard has

an apex such that an angle subscribed in the apex of the guard is smaller than an angle subscribed by said at least one cutting blade for progressively covering said at least one cutting blade during deployment of the penetrator.

40. (Amended) A surgical device, comprising:

a handle configured to be gripped;

a penetrator having a main axis and attached to said handle;

a tissue expander positioned on said penetrator;

a substantially planar cutting blade located at a distal end of said penetrator;

a substantially planar guard configured to slidably cover and uncover said at least one cutting blade, said guard being movable with respect to said tissue expander and being configured to selectively expose said cutting blade; and

a locking mechanism configured to hinder an accidental uncovering of said cutting blade by said guard wherein said guard has an apex such that an angle subscribed in the apex of the guard is smaller than an angle subscribed by said cutting blade for progressively covering said at least one cutting blade during deployment of the penetrator.

41. (Amended) A surgical device, comprising:

a handle configured to be gripped;

a penetrator having a main axis and attached to said handle;

a substantially planar cutting blade located at a distal end of said penetrator;

wherein said handle includes:

a tissue expander configured to expand a tissue cut by said cutting blade;

a substantially planar guard for slidably covering and uncovering said guard being moveable with respect to said tissue expander;

at least one side horn configured to facilitate pushing, pulling, rotation, and tilting of said surgical device wherein said guard has an apex such that an angle subscribed in the apex of the guard is smaller than an angle subscribed by said blade for progressively covering said blade during deployment of the penetrator.

42. (Amended) A surgical device, comprising:

means for gripping said surgical device;

means mounted on said means for gripping said surgical device for passing an object of interest into a hole in a tissue member;

means for expanding the tissue member which is mounted on said means for passing an object into the hole in the tissue member;

substantially planar cutting means mounted on said means for passing the object into the hole in the tissue member for cutting the hole for insertion of said means for passing an object into the hole in the tissue member, said means for cutting the hole in the tissue member being movable with respect to said means for expanding the tissue member; and

means for halting said means for cutting wherein said means for halting comprises means for guarding said means for cutting, said means for guarding said means for cutting being movable with respect to said means for expanding the tissue member wherein said means for guarding said means for cutting has an apex such that an angle subscribed in the apex of the means for guarding is smaller than an angle subscribed by said means for cutting for progressively covering said means for cutting during deployment of said means for expanding the tissue member.

43. (Amended) The surgical device according to claims 34, 37 or 39, wherein said cutting blade comprises:

a first blade edge attached to a distal end of said penetrator and oriented substantially parallel to a main axis of said penetrator and being configured to produce an opening in a body tissue for an insertion of a surgical cannula.

44. (Amended) The surgical device according to claim 43, wherein said cutting blade further comprises:

a second blade edge, wherein:

said second blade being attached to a distal end of said penetrator and oriented substantially parallel to said main axis of said penetrator; and

said second blade being edge configured to intersect said first blade edge at an intersection distal to said penetrator.

45. (Amended) The surgical device according to claim 43, wherein said first blade edge and said second blade edge intersect along said main axis of said penetrator.

46. (Amended) The surgical device according to claim 36, which comprises a seal which is concentrically positioned with said penetrator, said seal being positioned in said handle and being sealingly engageable with said flap valve.

47. (Amended) A surgical device, comprising:

a handle configured to be gripped;

penetrator means having a main axis and being attached to said handle;

substantially planar cutting means for cutting body tissue located at a distal end of said penetrator means;

tissue expander means expanded at a distal end of the penetrator means for expanding a tissue cut by said means for cutting tissue;

insufflation passageway means configured to discharge a pressurized fluid while said means cutting for cutting tissue is inside a body tissue and to transport said pressurized fluid to the body tissue when the cutting blade means substantially penetrates the body tissue; and

substantially planar guard means for guarding said means for cutting tissue, said guard means being movable with respect to said tissue expander means and configured to selectively expose said means for cutting tissue wherein said means for guarding said means for cutting tissue has an apex such that an angle subscribed in the apex of the means for guarding is smaller than an angle subscribed by said means for cutting tissue for progressively covering said means for cutting tissue during deployment of said means for expanding the tissue member.

48. (New) A surgical device, comprising:

a handle configured to be gripped;

a penetrator having a main axis and being attached to said handle;

a substantially planar cutting blade located at a distal end of said penetrator;

a tissue expander expanded at a distal end of the penetrator for expanding a tissue cut by said cutting blade;

an insufflation passageway configured for discharging a pressurized fluid while said cutting blade is inside a body tissue and for transporting said pressurized fluid to the body tissue when said cutting blade substantially penetrates the body tissue; and

a substantially planar guard movable with respect to said tissue expander and configured to selectively expose said cutting blade wherein said cutting tip is fixed to the penetrator so as to be immovable with respect to said penetrator.

49. (New) A surgical device, comprising:



a handle configured to be gripped;  
a penetrator having a main axis and being attached to said handle;  
a substantially planar cutting blade located at a distal end of said penetrator;  
a tissue expander expanded at a distal end of the penetrator for expanding a tissue cut  
by said cutting blade;

an insufflation passageway configured for discharging a pressurized fluid while said cutting blade is inside a body tissue and for transporting said pressurized fluid to the body tissue when said cutting blade substantially penetrates the body tissue; and

a substantially planar guard movable between said cutting blade and said expander and being movable with respect to said tissue expander, said guard being configured to selectively expose said cutting blade.

50. (New) A surgical device, comprising:

a handle configured to be gripped;  
a penetrator having a main axis and being attached to said handle;  
a substantially planar cutting blade located at a distal end of said penetrator;  
a tissue expander expanded at a distal end of the penetrator for expanding a tissue cut  
by said cutting blade;

an insufflation passageway configured for discharging a pressurized fluid while said cutting blade is inside a body tissue and for transporting said pressurized fluid to the body tissue when said cutting blade substantially penetrates the body tissue; and

a substantially planar guard movable with respect to said tissue expander and configured to selectively expose said cutting blade, said guard having a substantially planar portion thereof extending substantially parallel to said cutting blade.